THE MINERAL INDUSTRY OF ANGOLA

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The Republic of Angola, which is located in southern Africa, is bordered by the Atlantic Ocean to the west, Namibia to the south, the Democratic Republic of the Congo to the northeast, and Zambia to the east. In 2004, the population was estimated to be about 11 million and was growing at an estimated rate of about 1.93%. The country's total land area is about 1,246,700 square kilometers (km^2), which is an area comparable to slightly less than twice the size of Texas, and includes the enclave of Cabinda in the Democratic Republic of the Congo (U.S. Central Intelligence Agency, 2004§[1]). The International Monetary Fund (2005§) estimated Angola's gross domestic product (GDP) based on purchasing power parity to be about $36.8 billion in 2004 and the per capita GDP based on purchasing power parity to be about $2,457 for the same period (International Monetary Fund, 2005, p. 5). Angola's mineral industry was dominated by diamond and petroleum production. In 2003, diamond production accounted for about 95% of nonfuel exports and for about 10% of the nonfuel GDP. Petroleum production accounted for about 75% of Government revenue (International Monetary Fund, 2005, p. 5, 8).

Government Policies and Programs

In 2004, Angola continued to recover from 27 years of civil war. United Nations sanctions on the National Union for the Total Independence of Angola (UNITA) rebel movement were lifted in December 2002 following the signing of the Luena Memorandum of Understanding, which formalized the cease-fire agreement that prevailed after the death of UNITA's leader in January 2002 (U.S. Department of State, 2005§). The Front for the Liberation of the enclave of Cabinda, however, continued to be engaged in guerilla attacks against Government targets and to kidnap foreigners in an effort to press for the independence of Cabinda. National elections will be held in 2006 (U.S. Department of State, 2005§).

In February 2004, Angola formally adhered to the African Evaluation Mechanism by Pairs of the New Partnership for the Development of Africa (NEPAD). The NEPAD is a self-evaluation mechanism that focuses on African Union member states' performances in the fields of sustained cultural, economic, political, and social good governance, and aims to ensure that the policies and actions of the countries that adhere to it are in conformity with the African Union codes, standards, and values (Permanent Mission of Angola to the United Nations, 2004§). According to the U.S. Department of State (2005§), the Government of Angola estimated that about 4.7 million people were internally displaced by the civil war and that since 2002, about 300,000 of the country's 450,000 refugees had returned to Angola.

The Ministério de Geologia e Minas is the Government entity responsible for the negotiation of mineral rights contracts, for ensuring the application of mining laws, and for conducting geologic surveys. All mineral rights in Angola belong to the State and all mining and prospecting contracts must be approved by the Council of Ministers (The Diamonds and Human Security Project, 2004, p. 3). Corpo Especial de Fiscalização y Segurança de Diamantes was the Government agency accountable for oversight of the diamond sector; responsibilities included gathering intelligence and tracking exploration, mining, and sales activities of companies in the Angolan diamond industry (The Diamonds and Human Security Project, 2005, p. 3). Empresa Nacional de Diamantes de Angola E.P. (Endiama), which was the Government-owned diamond company, was responsible for administrating and regulating the diamond sector and was a partner in all diamond ventures. Endiama's subsidiaries included Sociedade de Comercialização de Diamantes de Angola (Sodiam), which was in charge of the marketing, sale, and trade of all diamond produced in Angola and the entity responsible for Kimberley Process compliance; and Endiama Prospeção e Produção S.A.R.L., which oversaw all Endiama's mining and prospecting interests. Sociedade Nacional de Combustíveis de Angola (Sonangol) was the Government-owned company responsible for petroleum exploration and production.

New institutional reforms in the diamond sector were introduced in 2004 and included a Government pledge to recapitalize Endiama and the creation of a new subsidiary for Endiama to develop mining ventures in its own right. As part of the sector's reorganization, the Government planned to put an end to informal diamond mining by incorporating artisanal miners into groups that would operate under licenses issued by Endiama. Other measures included the adoption of Decree No. 36/03 of June 27, 2003, under which all alluvial diamond licenses were to be authorized by the Ministry of Geology and Mining and all kimberlite mining projects were to be authorized by the Council of Ministers (International Monetary Fund, 2005, p. 23).

Structure of the Mineral Industry

The major foreign companies that operated joint ventures with Endiama in the diamond sector were Almazy Rossii-Sakha Joint Stock Company (ALROSA) of Russia, Bermuda-Registered ITM Mining Ltd. (ITM), the Leviev Group of Israel, Odebrecht Mining Services Inc. (Odebrecht) of Brazil, Petra Diamonds Ltd. of South Africa, and Trans Hex Group Ltd. of South Africa. The major international companies that operated in the petroleum sector included BP p.l.c., ChevronTexaco Corp., Exxon Mobil Corp., Norsk Hydro ASA, and Total S.A.

[1]References that include a section mark (§) are found in the Internet References Cited section.

In 2004, Sodiam opened offices in Antwerp and Tel Aviv that served as the country's official uncut diamond export sales sites. Sodiam planned to open additional offices in Dubai, China, and New York in 2005 (The Diamonds and Human Security Project, 2005, p. 5).

Trade

According to the U.S. Census Bureau, Angola's exports to the United States were valued at $4.52 million in 2004 compared with $4.27 million in 2003 and included $4.3 million of crude petroleum (U.S. Census Bureau, 2005b§). Imports from the United States were valued at about $594,000 in 2004 compared with about $491,000 in 2003. These included nearly $366,000 of drilling and oilfield equipment (U.S. Census Bureau, 2005a§). About 6 million carats of diamond were exported in 2003 at a value of $814 million compared with 5 million carats in 2002 at a value of $644 million (Kimberley Process, 2004§).

Commodity Review

Industrial Minerals

Diamond.—In addition to the Endiama joint ventures with foreign companies, which included ALROSA, ITM, the Leviev Group, Odebrecht, Petra Diamonds, and Trans Hex, diamond also was produced by artisanal miners. The International Monetary Fund (2005, p. 23) estimated that prior to 2003, between 250,000 and 400,000 artisanal miners worked in Angola and produced, at times, about one-third of Angola's diamond output.

Sociedade Mineira de Catoca Ltda. (SMC), which was the country's leading diamond producer, owned Catoca Mine. SMC was a joint venture among Endiama (32.8%), ALROSA (32.8%), the Leviev Group (18%), and Odebrecht (16.4%). In 2004, Catoca Mine produced about 3.6 million carats. SMC reported that it had invested more than $51 million to increase production capacity to about 8 million metric tons per year (Mt/yr) of ore by mid-2005. Reserve estimates at Catoca were reported to be 271 Mt of ore containing about 190 million carats of diamond (Sociedade Mineira de Catoca Ltda., 2005, p. 7-9, 29). Diamond production from Catoca Mine was sold to International Diamond Industries of Israel (The Diamonds and Human Security Project, 2004, p. 5).

Sociedade de Desenvolvimento Mineiro (SDM) operated the Luzamba project, which is located in Cuango Valley. The Luzamba project hosted the single largest alluvial operation in Angola. SDM, which was a 50/50 joint venture between Endiama and Odebrecht, planned to develop another alluvial deposit at Muanga in southern Cuango Valley in 2005 (The Diamonds and Human Security Project, 2004, p. 5; 2005, p. 6).

Energem Resources Inc. of Canada (formerly DiamondWorks Ltd.) held 48% interest in a joint venture with ALROSA and Espiritu Santo Bank of Portugal. The joint venture held 80% interest in the alluvial diamond deposits and 100% interest in five kimberlite pipes that were located on the Luo diamond concession. The concession was on care and maintenance status in 2004. During the year, Energem renegotiated commercial terms with the Government and sought additional exploration opportunities in the country (Energem Resources Inc., 2004, p. 12-13).

SouthernEra Diamonds Inc. of Canada in joint venture with Endiama and Welox Ltd. of Israel continued to await Government approval for the establishment of a limited-liability company under the name of Sociedade Mineira do Camafuca Lda. The joint venture planned to develop the primary kimberlite deposits associated with the Camafuca-Camazamba kimberlite pipe, which is located in Lunda Norte Province in northwestern Angola about 20 km southeast of the town of Lucapa. SouthernEra estimated total inferred mineral resources to be about 210 million cubic meters at an average grade of 0.111 carat per cubic meter containing about 23 million carats of diamond (SouthernEra Diamonds Inc., 2005, p. 8-9; SouthernEra Diamonds Inc., 2004§).

In December 2004, Petra Diamonds Limited signed a joint-venture agreement with BHP Billiton World Exploration Inc. for the development of the Alto Cuilo diamond project, which is located in northeastern Angola about 700 km southeast of Luanda. BHP could acquire a 75% interest in the project with an investment of $60 million. Petra, through its wholly owned subsidiary Petra Diamonds Alto Cuilo Limited (PDAC), held a 36% interest in the Alto Cuilo kimberlite exploration agreement and a 38% interest in the Alto Cuilo alluvial exploration agreement in partnership with Endiama and Organizações Moyoweno, an Angolan company. Petra's other interests in Angola included the Medio Kwanza concession, which is located west of Alto Cuilo, and the Muriege concession, which is located east of Alto Cuilo (Petra Diamonds Limited, 2005, p. 7-8; Petra Diamonds Limited, 2004§).

Trans Hex held a 35% interest in Luarica Mine and a 32% interest in Fucauma Mine, both of which are located in northeastern Angola. Luarica Mine, which began production in 2003, produced 95,000 carats of diamond in 2004. The company planned to upgrade the plant at Luarica and to increase production capacity to 14,000 carats per month by 2006 at a cost of $6 million. The Fucauma operation was in pilot production during 2004 with commissioning of the plant scheduled for 2005. The plant at Fucauma will have a production capacity of 10,000 carats per month. Trans Hex also held interest in the Gango and the Luana exploration concessions. Gango was at an early exploration stage with bulk sampling of the kimberlite expected by the third quarter of 2005. At Luana, dredge sampling was completed in 2004, and evaluation bulk sampling was expected by the third quarter of 2005 (Trans Hex Group Ltd., 2005, p. 13, 16).

Mineral Fuels

Petroleum and Natural Gas.—Petroleum is produced offshore the enclave of Cabinda, offshore in the Kwanza Basin north of Luanda, offshore the country's northern coast, and onshore around the city of Soyo. According to Sonangol (2005b§), more than 200 exploration and appraisal wells have been drilled in Angola since 1990. Deepwater exploration began in 1991 with the leasing of

Block 16, followed by the leasing of Blocks 14, 15, 17, 18, and 20. As of the beginning of 2000, a total of 29 offshore and onshore blocks had been licensed to 30 companies; the first floating production, storage, and offloading rig came online in August 2004.

Production from Block 0, which is located adjacent to the Cabinda coastline, accounted for about 70% of the country's total petroleum production. Average output in Block 0 was 600,000 barrels per day (bbl/d) (Sonangol E.P., 2005a§). ChevronTexaco was the operator of the block. In 2004, the company renewed the rights to the concession for an additional 20 years. Block 0 was divided into areas A and B. In 2004, production from Area A was 248,000 bbl/d of crude petroleum and 4,000 bbl/d of liquefied petroleum gas. In Area B, production averaged 119,000 bbl/d of crude petroleum. Block 14 was ChevronTexaco's second concession in Angola. In 2004, production averaged 57,000 bbl/d of crude petroleum. During the year, ChevronTexaco negotiated an extension to the exploration period for Block 14 and was planning a three-dimensional seismic program to assess the remaining potential of the block (ChevronTexaco Corp., 2005§).

Sonangol planned to construct a gas-condensate facility to produce liquefied petroleum gas; the facility was scheduled to come online in 2008 (Sonangol E.P., 2005b§). In addition, Sonangol planned to build a new refinery (Sonaref) in the city of Lobito, Benguela, which is located about 500 km south of Luanda, at a cost of $3.7 billion and a $3 billion liquefied natural gas plant in Soyo, which is located about 300 km north of Luanda. Sonaref will have a production capacity of 200,000 bbl/d and was expected to come onstream in 2008. The construction of Sonaref was expected to complement the production of Angola's existing refinery in Luanda and reduce Angola's exports of crude petroleum and crude natural gas (Sonangol E.P., 2005a§).

ExxonMobil held interest in five deepwater blocks in Angola. In 2004, the company announced its 17th petroleum discovery on Block 15, its 4th petroleum discovery on Block 31, and its 2d petroleum discovery on Block 32. In Block 15, the discovery well tested at a flowrate of 2,726 bbl/d of petroleum, and in Block 32, the discovery well tested at a rate of 6,800 bbl/d of petroleum. ExxonMobil's subsidiary Esso Exploration Angola (Block 15) Limited was the operator of Block 15 and held a 40% interest in the project. The remaining interest was shared by BP Exploration (Angola) Limited (26.67%), ENI Angola Exploration B.V. (20%), and Statoil Angola (13.33%). BP Exploration (Angola) Limited was the operator of Block 31 and held 26.67% interest in the block; Esso Exploration Angola (Block 31) Limited, Sonangol, and Statoil Angola held the remaining 25%, 20%, and 13.33% interests, respectively. TEPA Limited was the operator of Block 32 and held a 30% interest in the block; the remaining interest was held by Marathon Petroleum Angola (Block 32) Limited (30%), Sonangol (20%), Esso Exploration and Production Angola (Overseas) Limited (15%), and Petrogal Exploração (5%) (Exxon Mobil Corp., 2004b, c, d; 2005, p. 14).

In August 2004, ExxonMobil announced the beginning of production at its $3.4 billion Kizomba A project. Kizomba A is located about 370 kilometers northwest of Luanda and is the first of three production developments on Block 15 that are expected to yield collectively about 2.5 billion barrels of petroleum. The company reported estimated recoverable resources at Kizomba A as 1 billion barrels of gross petroleum with an expected production rate of about 250,000 bbl/d (Exxon Mobil Corp., 2004a).

References Cited

Energem Resources Inc., 2004, Yearend report—November 30, 2004: Vancouver, British Columbia, Canada, Energem Resources Inc., 25 p.
Exxon Mobil Corp., 2004a, ExxonMobil affiliate begins production in West Africa's largest deepwater development: Irving, Texas, Exxon Mobil Corp. press release, August 11, 1 p.
Exxon Mobil Corp., 2004b, ExxonMobil Angola subsidiary announces seventeenth deepwater discovery on Angola Block 15: Irving, Texas, Exxon Mobil Corp. press release, March 2, 1 p.
Exxon Mobil Corp., 2004c, ExxonMobil announces Canela discovery in deepwater Angola Block 32: Irving, Texas, Exxon Mobil Corp. press release, April 20, 1 p.
Exxon Mobil Corp., 2004d, ExxonMobil announces Venus discovery in deepwater Angola Block 31: Irving, Texas, Exxon Mobil Corp. press release, June 9, 1 p.
Exxon Mobil Corp., 2005, 2004 summary annual report: Irving, Texas, Exxon Mobil Corp., 50 p.
International Monetary Fund, 2005, Selected issues and statistical appendix: Washington DC, International Monetary Fund Country Report No. 05/125, February 25, 2005, 73 p.
Petra Diamonds Limited, 2005, 2004 annual report: St. Helier, Jersey, Channel Islands, Petra Diamonds Limited, 22 p.
Sociedade Mineira de Catoca Ltda., 2005, 2004 annual report: Luanda, Angola, Sociedade Mineira de Catoca Ltda., 43 p.
SouthernEra Diamonds Inc., 2005, 2004 annual report: Toronto, Ontario, Canada, SouthernEra Diamonds Inc., 16 p.
The Diamonds and Human Security Project, 2004, 2004 Diamond industry annual review: Ottawa, Ontario, Canada, The Diamonds and Human Security Project, 12 p.
The Diamonds and Human Security Project, 2005, 2005 diamond industry annual review: Ottawa, Ontario, Canada, The Diamonds and Human Security Project, 12 p.
Trans Hex Group Ltd., 2005, 2005 annual report: Cape Town, South Africa, Trans Hex Group Ltd., 76 p.

Internet References Cited

ChevronTexaco Corp., 2005, Angola fact sheet, accessed December 13, 2005, at URL http://www.chevron.com/operations/docs/angola.pdf.
International Monetary Fund, 2005 (September), Angola, World Economic Outlook Database, accessed December 13, 2005, via URL http://www.imf.org/external/pubs/ft/weo/2005/02/data/index.htm.
Kimberley Process, 2004, Chair's report to plenary, Kimberley Process Plenary Meeting, Gatineau, Canada, 27-29 October 2004, accessed December 21, 2005, at URL http://www.kimberleyprocess.com:8080/site/www_docs/plenary_meetings20/chair_report_to_plenary.pdf.
Permanent Mission of Angola to the United Nations, 2004, Angola adheres to the NEPAD evaluation mechanism, accessed December 21, 2005, at URL http://www.un.int/angola/press_release_nepad.htm.
Petra Diamonds Limited, 2004, Angola, Country Profile, accessed December 22, 2005, at URL http://www.petradiamonds.co.za.
Sonangol E.P., 2005a, Corporate strategies, accessed December 28, 2005, at URL http://www.sonangol.co.ao/sonangolEP/strategy_en.shtml.
Sonangol E.P., 2005b, History of the oil industry in Angola, accessed December 13, 2005, at URL http://www.sonangol.co.ao/sonangolEP/historyOil_en.shtml.
SouthernEra Diamonds Inc., 2004, Camafuca diamond project, accessed December 22, 2005, at URL http://www.southernera.com/operations/camafuca.html.
U.S. Census Bureau, 2005a, U.S. exports to Angola from 2000 to 2004 by 5-digit end-use code, accessed December 21, 2005, at URL http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c7620.html.
U.S. Census Bureau, 2005b, U.S. imports from Angola from 2000 to 2004 by 5-digit-end-use code, accessed December 21, 2005, at URL http://www.census.gov/foreign-trade/statistics/product/enduse/imports/c7620.html.

U.S. Central Intelligence Agency, 2004, Angola, World Factbook 2004, accessed December 13, 2005, at URL http://www.geoplace.com/hottopics/CIAwfb/factbook/geos/ao.html.
U.S. Department of State, 2005 (December), Angola, Background Note, accessed December 20, 2005, at URL http://www.state.gov/r/pa/ei/bgn/6619.htm.

TABLE 1

ANGOLA: PRODUCTION OF MINERAL COMMODITIES[1]

Commodity		2000	2001	2002	2003	2004
INDUSTRIAL MINERALS						
Cement:						
Hydraulic	thousand metric tons	511 [r, 2]	550 [r, 2]	597 [r, 2]	700 [r, e]	740 [e]
Clinker	do.	402 [2]	480 [2]	452 [2]	480 [e]	480 [e]
Diamond[3, 4]	thousand carats	4,313	5,159	5,022	5,700 [r]	6,100
Granite[e]	thousand cubic meters	1,500	1,500	1,500	1,500	1,500
Marble[e]	do.	100	100	100	100	100
Salt[e]	metric tons	30,000	30,000	30,000	30,000	30,000
MINERAL FUELS AND RELATED MATERIALS						
Petroleum:						
Crude	thousand 42-gallon barrels	273,000	270,100	329,600	321,200	361,715
Refinery products[e, 5]	do.	14,000	14,000	14,000	14,000	14,000
Gas, natural:						
Gross[6]	million cubic meters	11,613	-- [2]	--	-- [2]	--
Dry	do.	560	-- [2]	--	-- [2]	--
Liquefied petroleum gas	thousand 42-gallon barrels	1,626	--	--	-- [2]	--

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised -- Zero.

[1]Includes data available through November 2005.

[2]Reported.

[3]Does not include smuggled production.

[4]Production was approximately 90% gem and 10% industrial grade.

[5]Includes asphalt and bitumen.

[6]Angola has no natural gas distribution system. Most gas was vented and flared.